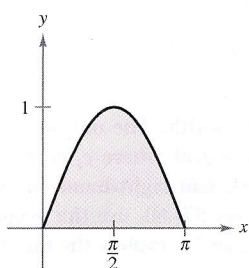
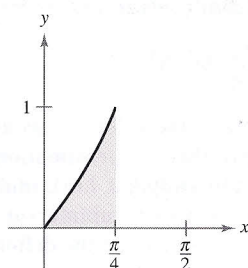


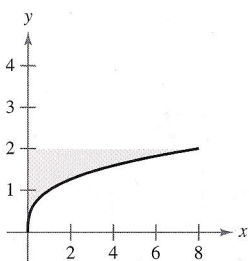
19. $f(x) = \sin x$



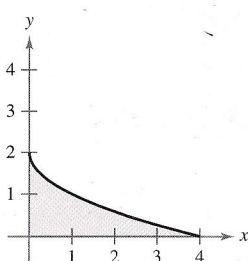
20. $f(x) = \tan x$



21. $g(y) = y^3$



22. $f(y) = (y - 2)^2$



In Exercises 23–32, sketch the region whose area is given by the definite integral. Then use a geometric formula to evaluate the integral ($a > 0$, $r > 0$).

23. $\int_0^3 4 \, dx$

24. $\int_{-a}^a 4 \, dx$

25. $\int_0^4 x \, dx$

26. $\int_0^4 \frac{x}{2} \, dx$

27. $\int_0^2 (2x + 5) \, dx$

28. $\int_0^8 (8 - x) \, dx$

29. $\int_{-1}^1 (1 - |x|) \, dx$

30. $\int_{-a}^a (a - |x|) \, dx$

31. $\int_{-3}^3 \sqrt{9 - x^2} \, dx$

32. $\int_{-r}^r \sqrt{r^2 - x^2} \, dx$

In Exercises 33–40, evaluate the integral using the following values.

$$\int_2^4 x^3 \, dx = 60, \quad \int_2^4 x \, dx = 6, \quad \int_2^4 dx = 2$$

33. $\int_4^2 x \, dx$

34. $\int_2^2 x^3 \, dx$

35. $\int_2^4 4x \, dx$

36. $\int_2^4 15 \, dx$

37. $\int_2^4 (x - 8) \, dx$

38. $\int_2^4 (x^3 + 4) \, dx$

39. $\int_2^4 \left(\frac{1}{2}x^3 - 3x + 2\right) \, dx$

40. $\int_2^4 (6 + 2x - x^3) \, dx$

41. Given $\int_0^5 f(x) \, dx = 10$ and $\int_5^7 f(x) \, dx = 3$, find

(a) $\int_0^7 f(x) \, dx$.

(b) $\int_5^0 f(x) \, dx$.

(c) $\int_5^5 f(x) \, dx$.

(d) $\int_0^5 3f(x) \, dx$.

42. Given $\int_0^3 f(x) \, dx = 4$ and $\int_3^6 f(x) \, dx = -1$, find

(a) $\int_0^6 f(x) \, dx$.

(b) $\int_6^3 f(x) \, dx$.

(c) $\int_3^3 f(x) \, dx$.

(d) $\int_3^6 -5f(x) \, dx$.

43. Given $\int_2^6 f(x) \, dx = 10$ and $\int_2^6 g(x) \, dx = -2$, find

(a) $\int_2^6 [f(x) + g(x)] \, dx$.

(b) $\int_2^6 [g(x) - f(x)] \, dx$.

(c) $\int_2^6 2g(x) \, dx$.

(d) $\int_2^6 3f(x) \, dx$.

44. Given $\int_{-1}^1 f(x) \, dx = 0$ and $\int_0^1 f(x) \, dx = 5$, find

(a) $\int_{-1}^0 f(x) \, dx$.

(b) $\int_0^1 f(x) \, dx - \int_{-1}^0 f(x) \, dx$.

(c) $\int_{-1}^1 3f(x) \, dx$.

(d) $\int_0^1 3f(x) \, dx$.

45. **Think About It** The graph of f consists of line segments and a semicircle, as shown in the figure. Evaluate each definite integral by using geometric formulas.

(a) $\int_0^2 f(x) \, dx$

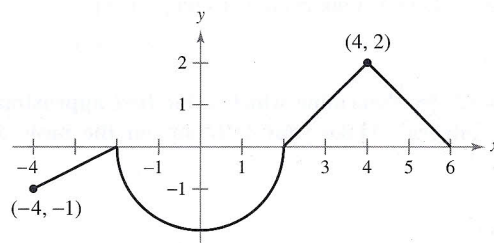
(b) $\int_2^6 f(x) \, dx$

(c) $\int_{-4}^2 f(x) \, dx$

(d) $\int_{-4}^6 f(x) \, dx$

(e) $\int_{-4}^6 |f(x)| \, dx$

(f) $\int_{-4}^6 [f(x) + 2] \, dx$



46. **Think About It** Consider the function f that is continuous on the interval $[-5, 5]$ and for which

$$\int_0^5 f(x) \, dx = 4.$$

Evaluate each integral.

(a) $\int_0^5 [f(x) + 2] \, dx$

(b) $\int_{-2}^3 f(x + 2) \, dx$

(c) $\int_{-5}^5 f(x) \, dx$ (f is even.)

(d) $\int_{-5}^5 f(x) \, dx$ (f is odd.)